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Improving Quality by Grading Cannery Products

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Bureau of Markets



A large, modern cannery in Pennsylvania

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IMPROVING QUALITY BY GRADING CANNERY PRODUCTS

By D. M. James and R. B. Donaldson

Bureau of Markets

Although Pennsylvania does not rank as a leading state in the manufacture of canned fruits and vegetables, the canning industry offers an important outlet for fruits and vegetables produced in the Commonwealth. Various other sections of the country which specialize more in large truck crop or fruit farms, have exceeded Pennsylvania in the production of vegetables and fruits for manufacture. Much of the vegetable production for manufacture is produced in small acreages. However, during the four years from 1925 through 1928, the plantings of tomatoes, corn, peas and snap beans for manufacture averaged nearly 11,500 acres. The bulk of this production and the location of most of the canneries in the State are in York and Adams counties, with this district extending into Franklin, Lancaster and several other counties.

The canned fruit industry consists largely of the manufacture of apple and grape products, principally in Adams and Erie counties, but the canning of cherries is also assuming greater importance in the Commonwealth.

Flat Rate Method of Purchase. Cannerymen in Pennsylvania have generally purchased their raw products on a flat rate basis. This rate, or "contract price," is determined before the canning season starts, and is incorporated into the contract which is signed by the canner and the grower. Many of these contracts specify what the canner considers acceptable quality, the main purpose of such specifications being to give the canner some recourse against receiving stock of inferior quality. Obviously very little effort is made by many growers to improve the quality delivered, the principal object being to get by with the limit of cull stock. Loads which the canner considers of very inferior quality are refused.

Such a system of purchase is unfair to both grower and canner, and has several disadvantages. From the standpoint of the grower it is unfair because it does not return increased compensation for the delivery of high quality, except where higher quality improves production sufficiently to increase the tonnage delivered to the cannery. The grower who produces inferior quality is paid at the same rate as his neighbor who has grown his crop with additional care and expense thereby enabling him to deliver higher quality to the canner.

This system of purchase is unfair to the canner because his efforts to put up high quality manufactured products are jeopardized by his acceptance of poor quality loads. As a result, the canning industry in Pennsylvania, as in other states, has been hampered by overproduction of the lower grades of canned goods. Such an unhealthy condition in the industry affects the canner's business, which in turn affects the growers with whom the canner contracts.

DEVELOPMENT OF TOMATO GRADING

During the winter of 1926-1927, the Pennsylvania Cannery Association requested the Pennsylvania Department of Agriculture to suggest methods which might be used to improve the quality of Penn-

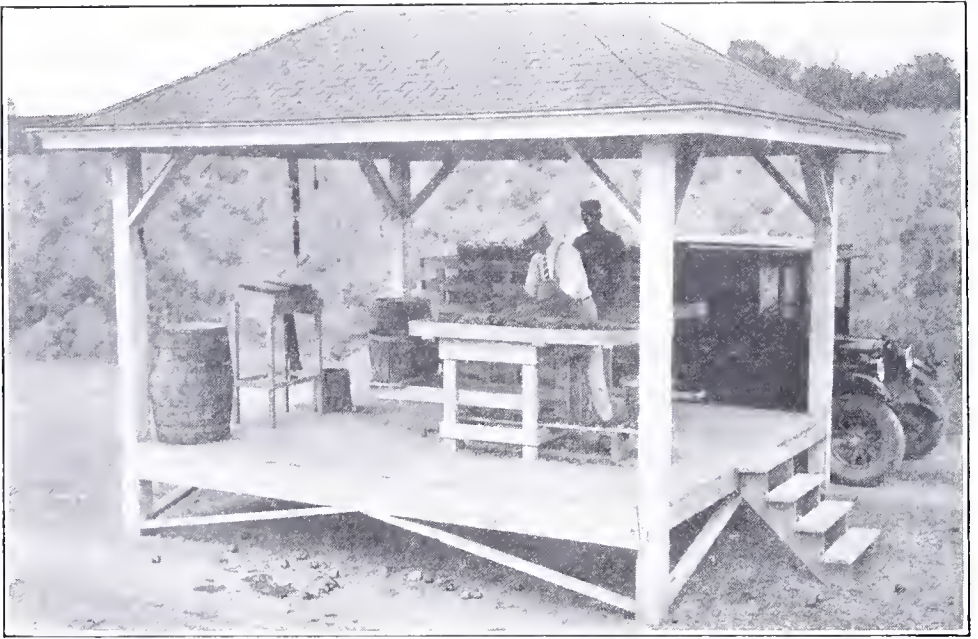


Fig. 1. A well equipped inspection platform

sylvania canned tomatoes. The Department suggested that the system of buying tomatoes by grade be adopted. The members of the association were interested in this suggestion, but hesitated to purchase the 1927 crop on a graded basis.

Work in 1927. No data were available showing what could be considered the average quality of Pennsylvania tomatoes, on the basis of the U. S. Cannery Tomato Grades. Without this information the canners were unable to determine what would be a fair price differential between the U. S. No. 1 and U. S. No. 2 tomatoes. Therefore, the Pennsylvania Bureau of Markets, with the assistance of three Pennsylvania canners, secured this information during the packing season of 1927. Loads of tomatoes received at the plants of the three cooperating canners were classified during the season, according to the specifications of the U. S. Cannery Tomato Grades. These deter-

minations were made from representative samples taken from various parts of the loads as delivered to the canneries. The figures obtained are shown in Table I.

Table I. Average Grades of Cannery Tomatoes Received at
Three Pennsylvania Canneries in 1927

	Cannery A <i>Per cent</i>	Cannery B <i>Per cent</i>	Cannery C <i>Per cent</i>	Average <i>Per cent</i>
U. S. No. 1 ..	50.6	51.8	51.7	51.4
U. S. No. 2 ..	40.0	39.2	37.9	39.0
Culls	9.4	9.0	10.4	9.6
Total ...	100	100	100	100

During the season a total of 196 loads were inspected. The most common defects were found to be green tomatoes, cat-faces, misshapen stocks, small tomatoes and various forms of mold and decay.

Work in 1928. Three canners in the State purchased tomatoes on the graded plan during the 1928 season, although only one of the three had written the price differential into his contracts with the growers. The contract of this canner provided that all tomatoes purchased would be graded by an inspector of the Pennsylvania Bureau of Markets. The U. S. No. 1 tomatoes delivered would return 50c a bushel to the growers, U. S. No. 2's would pay 40c, and nothing would be paid for culls. The other two canners who did not have these specifications written into their contracts, made arrangements with their growers to purchase tomatoes on the graded plan, using the same rates of purchase.

Several days before the start of the canning season, the Bureau of Markets furnished an inspector with experience in the interpretation of the U. S. Grades for cannery tomatoes. This inspector worked until the start of the season with a local man at each cannery who was trained to interpret the grades properly. These local men were licensed as state inspectors when they were found to be sufficiently trained. When the canneries began to receive tomatoes the local inspectors graded each load as it was delivered and continued to do so throughout the season. The supervising inspector kept in close contact with the three inspectors. Any decision made by the supervising inspector was to be final in case of a dispute. However, the grading proved to be very satisfactory, and the growers did not question the determination of the grades.

During the 1928 season, the canneries which used the graded system of buying, received a combined total of 452 tons of tomatoes. This was only about 40 per cent of the normal pack of these plants due to the adverse season, to the loss of some growers, and to the loss of many culls which were left in the fields after the growers came to realize that the canner did not pay to receive them. The percentages

of each grade of tomatoes received at two of the canneries during the season are shown in Table II.

Table II. Average Grades of Tomatoes Received at Two Pennsylvania Canneries in 1928

	Cannery A <i>Per cent</i>	Cannery B <i>Per cent</i>	Average <i>Per cent</i>
U. S. No. 1	44.4	36.7	40.6
U. S. No. 2	48.4	54.0	51.2
Culls	7.2	9.3	8.2
Total	100	100	100

The average for the two plants shows that the quality received dur-



Fig. 2. Official inspector classifying cannery tomatoes

ing 1928 was considerably lower than during 1927 (Compare with Table I), due to the unfavorable weather conditions.

Although the percentage of the various grades received by canners A and B averaged nearly the same for the season, there was a wide variation between the poorest and best loads received during the season. This is shown by the following comparison.

Table III. Comparison of Highest and Lowest Quality Loads Received in 1928

	U. S. No. 1	U. S. No. 2	Culls
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Poorest Load ..	4	48	48
Best Load	85	15	..

A canner buying on a flat rate basis would have paid equally for the two loads shown in Table III, although one contained nearly 50% of culls, which could not be canned, while the other contained no culls but 85% of the highest grade stock from which a large percentage of Fancy grade goods could be produced. Furthermore, the flat rate system would have penalized the grower of the higher quality load, since the rate must be fixed at a compromise level, which is determined by the average value of the good and the poor quality delivered.

Table IV is given to show how quality affects price under a graded system of purchasing cannery tomatoes. The price per ton at a flat rate of 40c a bushel for everything received is compared with prices per ton computed from various prices for U. S. No. 1's and U. S. No. 2's with no return for culls.

This table shows that the canner may choose a price differential which will figure him approximately the same average price per ton, throughout the season as the flat rate basis, and at the same time will enable him to pay a large premium for loads of high quality.

Table IV. Price Comparisons for Different Rates of Purchasing Cannery Tomatoes, Based on Grades Found at Pennsylvania Canneries During 1927 and 1928

	1927 3 Canneries	1928 2 Canneries	Average 1927 and 1928	Best Load 1928	Poorest Load 1928
U. S. No. 1	51.4%	40.6%	47.1%	85%	4%
U. S. No. 2	39.0%	51.2%	43.9%	15%	48%
Culls	9.6%	8.2%	9.0%	48%
Cost per ton at 40c. per bu. flat rate	\$13.32	\$13.32	\$13.32	\$13.32	\$13.32
Cost per ton at 50c. per bu. for No. 1's and 40c. for No. 2's	\$13.75	\$13.58	\$13.68	\$16.15	\$7.06
Cost per ton at 55c. per bu. for No. 1's and 40c. for No. 2's	\$14.58	\$14.25	\$14.45	\$17.54	\$7.12
Cost per ton at 60c. per bu. for No. 1's and 40c. for No. 2's	\$15.45	\$14.92	\$15.25	\$18.98	\$7.19

Results of Grading Work. From the standpoint of meeting the favor of the growers and canners during the 1928 season, the graded system of buying tomatoes must be considered successful. At first many growers were skeptical about the plan and some would not

contract for their tonnage. Most of the grower opposition disappeared before the season was far advanced. Confidence in the plan grew, and most of the growers were enthusiastic for grading before the end of the year.

The canners were pleased with the results obtained from the work during the first season. One canner stated that his 1928 pack consisted of 40% increase in the percentage of Extra Standard Grade, and an 8% increase in the Fancy Grade over his 1927 pack. He attributed this higher quality to the fact that many growers left the culls in the field during the 1928 season, since no returns were made for them. The other canners stated that they were enabled to put up higher quality packs because of the graded system of purchase.

Reestablishing the Pennsylvania tomato canning industry to the position which it once held, rests largely upon the canners to place the industry on a quality rather than a quantity basis. The canneries are, for the most part, small units which cannot compete successfully on a quantity basis with the larger operators in certain other sections of the country. If the graded system of purchasing raw tomatoes will aid materially in the manufacture of higher quality canned goods, as results obtained indicate, Pennsylvania canners generally should adopt the grade system of buying. The experience gained from the work shows that a considerably higher price should be paid for the U. S. No. 1 Grade of tomatoes than for the U. S. No. 2 Grade. A slight differential in price between these two grades does not offer enough additional inducement to the grower to justify using greater care in growing and handling the crop.

U. S. STANDARDS FOR CANNING TOMATOES (1926)**Grades**

U. S. No. 1 shall consist of tomatoes which are firm, ripe, well colored, well formed, free from molds and decay and from damage caused by growth cracks, worm holes, cat-faces, sunscald, freezing injury, or mechanical or other means. (See minimum size).

U. S. No. 2 shall consist of tomatoes which do not meet the requirements of the foregoing grade but which are ripe and fairly well colored and which are free from serious damage from any cause. (See minimum size).

Culls are tomatoes which do not meet the requirements of either of the foregoing grades.

Minimum Size

The minimum size may be fixed by agreement between buyer and seller. Tomatoes below this specified minimum size shall be classed as Culls.

Definitions of Terms

As used in these grades:

“Firm” means that the tomato is not soft, puffy, shriveled or water soaked.

“Well colored” means that the tomato shows at least 90% good red color.

“Fairly well colored” means that the tomato shows at least two-thirds good red color.

“Well formed” means that the tomato shall not be extremely flat or otherwise badly misshapen.

“Damage” means any injury which cannot be removed in the ordinary process of trimming and peeling without a loss of more than 10% (by weight) of the tomato in excess of that which would occur if the tomato were perfect.

“Serious damage” means any injury which cannot be removed in the ordinary process of trimming and peeling without a loss of more than 20% (by weight) of the tomato in excess of that which would occur if the tomato were perfect.

Copy of Canner's Contract for Purchasing Tomatoes on Graded Basis

....., Pa..... 1929.

This Agreement between....., Canner, hereinafter called party of the first part, located at....., and the Farmer, hereinafter called the party of the second part, located at....., witnesseth:

That party of the second part agrees to grow and deliver to party of the first part at the.....canning factory..... acres of tomatoes and to be paid the following prices by the party of the first part:

U. S. Grade No. 1—....¢ per bushel of 60 lbs.

U. S. Grade No. 2—....¢ per bushel of 60 lbs.

U. S. Grade No. 1 shall consist of tomatoes which are firm, ripe, well-colored, well-formed, free from molds and decay and from damage caused by growth cracks, worm holes, cat-faces, sun scalds, freezing injury or mechanical or other means, and shall not be less than..... inches in diameter.

U. S. Grade No. 2 shall consist of tomatoes which do not meet the requirements of the foregoing grade but which are ripe and fairly well-colored which are free from serious damage from any cause, and shall not be less than.....inches in diameter.

All other tomatoes that are not fit for human consumption will be classed as culls and will be thrown out and for which there will be no compensation.

No tomatoes will be received on Saturdays without consent of the Canner nor after six o'clock P. M. on any other day.

All tomatoes delivered on this basis to be settled for on or about December 1st, 1929.

The quality or grade shall be determined by an inspector, who shall be licensed by the Bureau of Markets, Pennsylvania Department of Agriculture, Harrisburg, Pa. Said inspector shall be under the instructions of a supervising inspector from that Department and subject to his decisions.

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CANNERY APPLE GRADING

Prior to the 1928 crop year, Pennsylvania canners made no attempt to classify canning apples into definite grades. The prevailing practice has been to purchase raw stock, for the most part, on the basis of three rather general classes; namely, "Packing-house Culls," "Drops" and "Orchard Run" fruit. Prices paid by the canners for fruit are based on quality only in a general way. Buyers visit the orchards to examine the fruit on the trees, setting the price for the entire block delivered to the cannery "orchard run with rots out." Packing house culls and drops are purchased on a flat rate basis, with little emphasis placed on quality, and generally with no increased price paid for better-than-the-average quality.

It has been felt that the purchasing of canning apples under such methods of payment has been unfair to the growers of good quality fruit as well as to the canner. Many growers, voicing dissatisfaction with the "flat rate" sales, hesitate to use the best cultural practices as an aid to producing high quality apples, since little, if any, added compensation is made for delivering higher quality fruit to the cannery. Increased costs of production are not justified unless a sufficiently high return is received from the sale of higher quality apples.

The canner must dispose of his manufactured products through a trade which is becoming increasingly exacting as to quality, while the quality of the raw stock received from the growers does not improve from year to year.

Initial Steps in Cannery Apple Grading. During the fall of 1928 the first attempts were made to classify apples into definite grades received at Pennsylvania canneries. Temporary grades were formulated which consisted of "Cannery No. 1," "Cannery No. 2" and "Ciders." The No. 1 grade included all sound apples which did not have greater than normal waste in peeling and coring. The No. 2 Grade included all sound apples which had more than normal waste in peeling and canning, but not more than one-third additional waste than normal waste. Apples not qualifying for either of these grades were classified as "Ciders."

An inspector employed by the Bureau of Markets took samples from 609 loads of apples received at two Pennsylvania canneries during the 1928 harvesting season. By using the temporary specifications as a basis for the grading, the percentage of "No. 1's," "No. 2's" and "Ciders" was determined for each load. A wide range in quality was found. In general the "orchard run" stock showed the best quality, averaging 81.6% No. 1's, 14.5% No. 2's and 3.9% ciders. The "Drops" showed the poorest quality. The individual loads varied greatly in quality, the best showing 98% No. 1's, 2% No. 2's and no ciders, while the poorest load showed only 5% No. 1's, 65% No. 2's

and 30% ciders. Table V shows the average grades of 609 loads of canning apples received at two canneries in Pennsylvania during 1928.

Table V. Grading Results of 609 Loads of Canning Apples, 1928 Season

	Cannery No. 1	Cannery No. 2	Ciders
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Orchard Run			
Best Load	98	2
Poorest Load	50	35	15
Average Load	81.6	14.5	3.9
Packing House Culls			
Best Load	95	5
Poorest Load	5	85	10
Average Load	62.5	33.2	4.3
Drops			
Best Load	80	20
Poorest Load	5	65	30
Average Load	50.2	34.3	15.5

The grading of cannery apples during 1928 made it possible to suggest to the U. S. Department of Agriculture what the Pennsylvania apple canners considered workable grades to be used in the purchasing of cannery apples. It is hoped that U. S. Grades for canning apples will be issued before the 1929 season, so that Pennsylvania canners may purchase stocks on the basis of these grades during the 1929 apple harvest.

In order to show how quality affects price under a graded system of purchase, Table VI is given. Arbitrary prices are taken for comparisons only. Assuming that all stock delivered was paid for at the same rate, although slightly different rates were paid for orchard run stock, packing house culls and drops, the best load and the poorest load would have returned the same rate to the grower. On a graded basis these two loads would have returned greatly different prices per ton. A difference in price of over \$8.00 a ton between high and low quality loads is a real incentive to the grower to produce high quality.

Table VI. Price Comparisons for Variable Quality of Cannery Apples

	Orchard Run (Average Load)	Packing House Culls (Average Load)	Drops (Average Load)	Best Load	Poorest Load
Cannery No. 1 ...	86.6%	62.5%	50.2%	98%	5%
Cannery No. 2 ...	14.5%	33.2%	34.3%	2%	65%
Cider	39.0%	4.3%	15.5%	30%
Price per ton at flat rate of 80c. cwt.	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00
Price per ton at rate of \$1.00 cwt. for No. 1's, 60c. cwt. for No. 2's and 40c. cwt. for ciders .	\$18.36	\$16.82	\$15.40	\$19.84	\$11.20

DEVELOPMENT OF GRAPE GRADING

No attempt was made in Pennsylvania to classify grapes to be used in the manufacture of grape products prior to the 1928 season. The price per ton which the growers received from the manufacturer was based on quality only in a general way, with no premium paid for the best grades.

During the 1928 grape harvesting season approximately 2,826 tons of grapes for manufacture were inspected by Federal-State inspectors in the Erie county grape belt. The U. S. Grape Grades were used as the basis for the inspections. The grapes were placed into the "U. S. No. 1 Juice" grade, or if they failed to meet these requirements were considered "unclassified." Certain requirements of the "U. S. No. 1 Juice" grape grade were waived, including straggly bunches, small bunches and crushed berries. The pool prices were figured for the season on the basis of the two classes of grapes, and a premium price was paid for the U. S. No. 1 stock.

CONCLUSIONS

A total of approximately 8,842,000 pounds of raw cannery products were inspected and classified by inspectors of the Pennsylvania Department of Agriculture during 1928, consisting of 5,653,000 pounds of grapes, 2,284,000 pounds of apples and 905,000 pounds of tomatoes.

Although the graded system of selling raw cannery products is a new development in Pennsylvania, the success of the work during 1928 indicates that selling cannery products on a graded basis will increase in the Commonwealth. Growers and canners believe that returns should be based on quality, and that supervised inspection is the fairest method for determining the quality.

